Name:
Date:
General weather conditions:

		Ditch	River
1.	Conductivity (µS/cm)		
	Specific conductance		
	Conductivity Temp (C)		
2.	pH 1		
	pH 2		
	pH3		
	Avg pH		
	Temp (C)		
3.	Dissolved Oxygen (%)		
	Dissolved Oxygen (mg/L)		
	DO Temp (C)		
4.	Turbidity (NTU)		
	Give your water system a '*grade*' (A through F)		

Parameter ranges:

Conductivity:

Distilled water	Rivers and streams	Rivers with healthy fisheries	Heavily polluted waters
0.5 to 3 µS/cm	50 to 1500 µS/cm (large natural variability)	150 to 500 µS/cm	10,000 + µS/cm

pH: 1 – 2 -3 – 4 – **5 – 6 – 7 – 8 – 9** – 10 – 11 – 12 – 13 – 14

Acidic — Neutral — Basic

tolerable range for aquatic life

Turbidity:
0 NTU (Excellent)
1-40 NTU (Good)
39-100 NTU (Fair)
>101 NTU (Poor)

DO: dependent upon time of day, temperature, elevation
0-2 mg/L: not enough oxygen to support life.
2-4 mg/L: only a few fish and aquatic insects can survive
4-7 mg/L: good for many aquatic animals, low for cold water fish
7-11 mg/L: very good for most stream fish

Water Chemistry

What is it again?

Conductivity: a measure of the ability of water to pass an electrical current. Conductivity in water is affected by the presence of inorganic dissolved solids such as chloride, nitrate, sulfate, and phosphate anions (ions that carry a negative charge) or sodium, magnesium, calcium, iron, and aluminum cations (ions that carry a positive charge). Organic compounds like oil, phenol, alcohol, and sugar do not conduct electrical current very well and therefore have a low conductivity when in water. Conductivity is also affected by temperature: the warmer the water, the higher the conductivity. For this reason, conductivity is reported as conductivity at 25 degrees Celsius (25 C).

Conductivity in streams and rivers is affected primarily by the geology of the area through which the water flows. Streams that run through areas with granite bedrock tend to have lower conductivity because granite is composed of more inert materials that do not ionize (dissolve into ionic components) when washed into the water. On the other hand, streams that run through areas with clay soils tend to have higher conductivity because of the presence of materials that ionize when washed into the water. Ground water inflows can have the same effects depending on the bedrock they flow through.
http://water.epa.gov/type/rsl/monitoring/vms59.cfm

pH: pH is a measure of how acidic/basic water is. The range goes from 0 - 14, with 7 being neutral. pHs of less than 7 indicate acidity, whereas a pH of greater than 7 indicates a base. pH is really a measure of the relative amount of free hydrogen and hydroxyl ions in the water. Water that has more free hydrogen ions is acidic, whereas water that has more free hydroxyl ions is basic. Since pH can be affected by chemicals in the water, pH is an important indicator of water that is changing chemically. pH is reported in "logarithmic units". Each number represents a 10-fold change in the acidity/basicness of the water. Water with a pH of five is ten times more acidic than water having a pH of six.
http://water.usgs.gov/edu/ph.html

Dissolved Oxygen: Rapidly moving water, such as in a mountain stream or large river, tends to contain a lot of dissolved oxygen, whereas stagnant water contains less. Bacteria in water can consume oxygen as organic matter decays. Thus, excess organic material in lakes and rivers can cause eutrophic conditions, which is an oxygen-deficient situation that can cause a water body "to die." Aquatic life can have a hard time in stagnant water that has a lot of rotting, organic material in it, especially in summer (the concentration of dissolved oxygen is inversely related to water temperature), when dissolved-oxygen levels are at a seasonal low. Water near the surface of the lake– the epilimnion– is too warm for them, while water near the bottom–the hypolimnion– has too little oxygen. Conditions may become especially serious during a period of hot, calm weather, resulting in the loss of many fish. You may have heard about summertime fish kills in local lakes that likely result from this problem. http://water.usgs.gov/edu/dissolvedoxygen.html

Turbidity – Measure of water clarity. It is measured by determining how much light can pass through a given volume of water. The more suspended particles in the water, the more light is refracted and the greater the turbidity of the water. Suspended particles can be clay, silt, sand, algae, plankton, or microbes. Higher turbidity allows less light to penetrate the water, which can reduce aquatic photosynthesis. Less photosynthesis = less dissolved oxygen. Additionally, high turbidity can increase the temperature of the water because particles can absorb more heat. Higher temperatures reduce the water's ability to hold onto dissolved oxygen. Cold water stores more dissolved oxygen. Large amounts of suspended particles can impact fish health by clogging their gills and lowering their growth rates. The sediment can settle on the bottom of the stream and cover fish eggs and benthic macro-invertebrates.
http://water.epa.gov/type/rsl/monitoring/vms55.cfm